ABSTRACT

The United States Environmental Protection Agency (U.S. EPA) has identified the recovery of HFC-134a, a vehicle refrigerant used in 1995 and newer model years, from End of Life Vehicles (ELVs) as a greenhouse gas reduction strategy. This analysis estimates the amount of HFC-134a remaining in the air-conditioning units of California's population of ELVs, defined as vehicles that have been issued a junk title or salvage certificate over their lifetime, to determine if enforcement of federal regulations pertaining to its removal and storage on licensed vehicle dismantler lots in California is warranted. To determine the amount of HFC-134a remaining in ELVs, refrigerant samples, including HFC-134a and its predecessor, R-12, were obtained from 2,002 ELVs on 30 licensed vehicle dismantler lots throughout California from January 2008 through August 2009. Of these sampled vehicles, 1,340, or 67%, were ELVs. Across the sampled ELVs containing HFC-134a, an average of 27% of the vehicles' total refrigerant capacity, or 220 grams of HFC-134a, was recovered. The amount of HFC-134a recovered from sampled ELVs varied widely by vehicle and was not strongly correlated with vehicle or geographic specific characteristics.

In order to extrapolate our sample findings to the entire state, California's ELV population from 2000 through 2008 was estimated using California Department of Motor Vehicle (CA DMV) registration records as well as vehicle Smog Check histories. The mean model year of the ELV population from 2000 through 2008 was significantly different from the sampled ELVs, though both distributions were normal. We then narrowed the scope of the analysis to focus on the time frame 2005 through 2007 to better reflect the distribution of the sample, as well as the forecasted population of ELVs going forward. From 2005 through 2007, there were 1,020,938 ELVs containing HFC-134a, an average of 340,313 a year.

From 2000 through 2008, ELVs were owned by 2,107 unique vehicle dismantler locations in California as well as 487 non-dismantling businesses. In 2007, the most recent year for which reliable data is available, 79% of the ELV population was owned by licensed vehicle dismantlers within California. An additional 20% of the ELV population in California was owned by non-dismantler businesses while 1% was owned by dismantlers operating without a proper license. Any U.S. EPA efforts to improve the recovery of HFC-134 would be successful in regulating 79% of the ELV population. Thus, we estimate that an average of 59,146 kg of HFC-134a remained in the air conditioning units of ELVs at licensed California dismantlers each year from 2005 through 2007.

Each year the portion of ELVs containing HFC-134a grows by an average of 3%. The total amount of HFC-134a remaining in ELVs on vehicle dismantler lots will continue to grow and by 2012 we project that approximately 68,566 kg of HFC-134a will remain in ELVs on licensed dismantler lots in California each year. Thus, the maximum potential benefit to any increased enforcement of U.S. EPA regulations pertaining to the removal and storage of HFC-134a would increase from 59,146 kg of HFC-134a in 2007 to 68,566 kg of HFC-134a in 2012.